#INSPIREDMATH

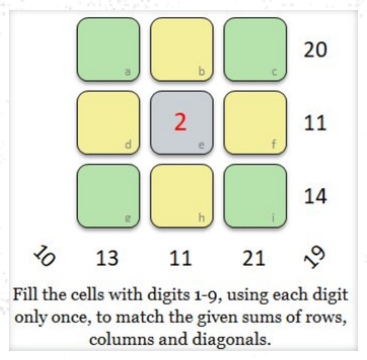
FEBRUARY 2019, VOLUME 7

"ANYONE, ANYONE?"

Do you remember the economics teacher from the 1986 movie, *Ferris Bueller's Day Off*? (Remind yourself here for a good chuckle!) Although funny, there are elements of his questioning technique that are still around. For example, wait time. On average, teachers wait between 0.7 and 1.4 seconds after asking a question before repeating the question or rewording it (Stahl, 1994). On the flip side, students need between one and 10 seconds to process the question in order to answer it! Another element is the type of question being asked. What is the purpose of asking questions? Answering this question is our February focus!

https://www.youtube.com/watch?v=7Ph2NCOiDNU

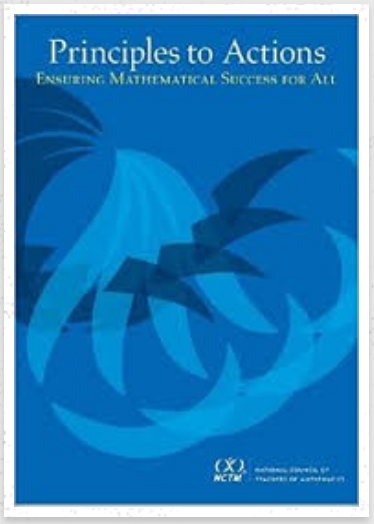
PROBLEM OF THE MONTH!



Get your students thinking with the problem of the month. Using the numbers 1-9 only one time each, create the sums listed for each row, column, and diagonal! If you're interested in finding more of these great puzzles, follow @1to9puzzle on Twitter. Still want more? Head over to Open Middle for a plethora of problems similar to this aligned to grade levels K-12! This is a great tool to truly up the rigor in your classroom!

FEBRUARY'S FOCUS: PRACTICE #5

1. Establishing mathematics goals to focus learning
2. Implement tasks that promote reasoning and problem solving
3. Use and connect mathematical representations
4. Facilitate meaningful discourse
5. **Pose purposeful questions**
6. Build procedural fluency from conceptual understanding
7. Support productive struggle in learning mathematics
8. Elicit and use evidence of student thinking



POSING PURPOSEFUL QUESTIONS

Asking students questions is a great teaching practice. But the *type* of questions we ask is critical in progressing student learning. "Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships." (Principles to Actions, p. 35)

The four purposes (types) of teacher questions are

1. To gather information - Student recalls facts, definitions, or procedures
2. To probe thinking - Student will need to explain, elaborate, or clarify their thinking
3. To make the mathematics visible - Student will discuss structure and make connections among ideas and relationships
4. To encouraging reflection and justification - Student shows a deep understanding of reasoning and action, including arguing for validity

These types are listed from low depth and complexity in student response to high. What is interesting is they are also listed from high teacher frequency type to low. Keep reading for tips on how to pose more purposeful questions in your own classroom.

TIPS TO TRY

1. PLAN your questions when you create your lesson. Establish your learning goals for the lesson and anticipate student responses. This will guide your own questions.
2. POST purposeful questions in your class so you and your students can see and anticipate them! They are not a secret!
3. Monitor YOUR participation. 80% of class talk comes from the teacher. Work towards balancing that scale then eventually putting more weight on the students!
4. Elicit and extend STUDENT thinking. Ask probing, clarifying, and reflective questions! Make sure you don't just funnel them to a desired conclusion.

A TEACHER'S TASK

Factual questions comprise the majority of questions asked in a mathematics class (Dougherty & Foegen, 2010). Let's change that! Forget factual questions, let's strive for:

- Reversibility questions - Promotes the ability to think in different ways; give the answer and have the student write the problem. Example - Find an expression that can be simplified to 15 + 3y.
- Generalization questions - Encourage students to find and describe patterns; ask them what they notice, what they wonder. Example - Find an algebraic expression with four terms that can be simplified to an expression with two terms. What do you notice about the terms?
- Flexibility questions - Allows students to solve a problem in multiple ways. Example - Write an equivalent expression to 3b - 8. Write another equivalent expression to 3b - 8.

Think about an upcoming lesson or assessment. Check your questions. Write a few reversibility, generalization, and flexibility questions and see what happens!

Can the questions you're asking be answered with a simple "yes" or "no"? Click below for 100 question stems that promote deep thinking!

Ready: 100 questions that prom... www2.curriculumassociates.com

100 Questions to Promote Mathematical Discourse by Ready author Dr. Gladis Kersaint. A free printable with 100 questions to promote mathematical thinking and encourage classroom discourse.

WHO TO FOLLOW ON TWITTER

@EXPLOREMTBOS

Explore the Math Twitter Blog-o-Sphere! Not sure what that is? It's a community of math teachers who blog and/or tweet and/or read blogs or tweets. Mostly they use #MTBoS to connect and any math teacher who blogs and/or tweets is encouraged to use it! There is nothing official about #MTBos, just a bunch of folks talking math around the world!

@JOBOALER

Dr. Jo Boaler is a Professor of Mathematics Education at Stanford University, serves as the faculty director of youcubed.org., and is the author of nine books and numerous research articles. Youcubed.org delivers on their goal to inspire, educate, and empower teachers of mathematics by transforming current research into accessible and practical forms.

@DESMOS

Explore math with their free online graphing calculator and networked classroom activities. Tweets are by @eluberoff and @ddmeyer so you know they are inspirational and informative!

MATH EXTRAVAGANZA – THERE IS STILL TIME!

Space is limited and locations are filling up every week but you do NOT want to miss out! The feedback has been amazing and we know that Indiana students are going to reap the benefits of all the passionate and dedicated math teachers this state has to offer!

The day will focus on promoting and developing ambitious instruction in the K-12 mathematics classroom using NCTM's *Eight Effective Teaching Practices* as outlined in *Principles To Action* (2014). In the morning, educators will participate in an interactive presentation with the IDOE math specialists to discuss the research, resources, and strategies aligned to each practice. The afternoon session will be dedicated to guided implementation time. Educators will be given the opportunity to apply what they have learned in a safe and collaborative environment. Ideas will be shared and connections made!

Details:

- Five PGP's will be given for educators who attend the full day professional development
- Educators should bring a laptop or other device
- Each site will have the following schedule, with minor variations in time, dependent upon location:

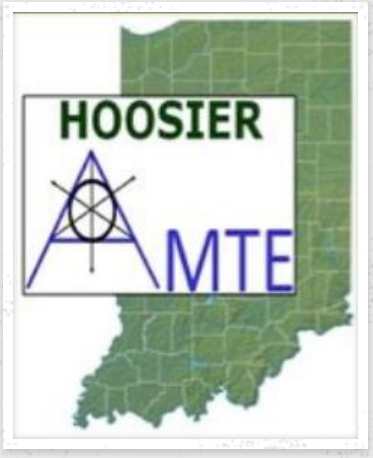
  8:30 a.m. – 2:30 p.m. with a one-hour lunch on your own
- Space is limited to 100 educators at each location - sign up quickly to reserve your seat!

Click here for locations, dates, and registration links.

OPPORTUNITIES FOR THE FIELD

7-12 MATHEMATICS CONTENT EXPERT WORK GROUP - ROUND 2

Educators from ALL high school courses are needed with calculus, quantitative reasoning, finite, and probability and statistics being the greatest needs!! We will continue the hard work of developing practical examples and digital resources for every standard in every course. Your work and expertise are valued and will affect all students throughout Indiana! Register here to join us on Monday, March 18, 8:30 a.m.to 2:30 p.m. at the Indiana Association of School Principals in Indianapolis. You will earn 5 PGP points for your dedication.



HAMTE MATHEMATICS TEACHER LEADERSHIP CONFERENCE

The fourth annual HAMTE Mathematics Teacher Leadership Conference will be Friday, March 22, at the University of Indianapolis. Keynote speaker John SanGiovanni will offer his insights about the development of mathematical fluency. Morning and afternoon sessions will focus on other specific issues related to mathematics teaching and teacher leadership in elementary and middle schools. Your IDOE math team will even be there to hold a session titled **Utilizing the Math Framework to Plan Effective Instruction!** For additional information and registration, please click here.

EDUCATOR SPOTLIGHT: MATT WALSH

After serving as the assistant principal at Brownsburg West Middle School and the Director of Curriculum in Brownsburg, Matt has served the Brownsburg Schools as the Secondary Social

Studies Administrator, known previously as Brownsburg Junior High School, in Brownsburg. In the summer of 2018, Matt left the Brownsburg Schools after 18 years. Currently, he serves as the Curriculum Specialist with the Indiana Department of Education.

When he taught global studies to seventh graders at Brownsburg, his diverse instructional strategies included the use of video demonstrations, PowerPoint and the Internet. As part of his "Building Better Communities" unit, Walsh's students addressed the city's complex transportation problems by interviewing experts worldwide. They then created a Web site presentation for the Indianapolis Metropolitan Planning Organization about the potential impact on the city of a monorail system. In their "Youth Forum" unit, Walsh's students practiced writing editorials, some of which were published in the Indianapolis Star. Walsh also joined two other Milken Educators in designing a distance learning curriculum known as ELEVATE. Walsh serves on the Indiana University Education Alumni Board and Indiana's Education Technology Commission. In 2002, he was named Brownsburg Community School Corporation Teacher of the Year. In 2015, Matt was awarded the “Realizing the Dream” Award from Marian University. In his spare time, Matt works as a consultant for developing school administrators in the iLead Program at the University of Indianapolis.

MATHEMATICS EDUCATOR SPOTLIGHT NOMINATION

We are always looking for rock-star math educators who are innovative and inspiring. Educators who lead, learn, and collaborate with humility and passion. If you know someone (or are that someone) click the button and nominate them (or yourself)!

SUPPORTS FROM ASSESSMENT

ILEARN MATHEMATICS FAQS

The Office of Assessment has provided a document answering all of your questions regarding the ILEARN assessment, test blueprints, item specifications, calculator policies, and much more!

RANGE PERFORMANCE LEVEL DESCRIPTORS

Do you want to know what’s going to be tested on the ILEARN Mathematics assessment? PLDs are a great resource! PLDs share the knowledge and skills related to the Indiana Academic Standard that students need to show on the ILEARN assessment.

YOUR IDOE MATHEMATICS TEAM

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